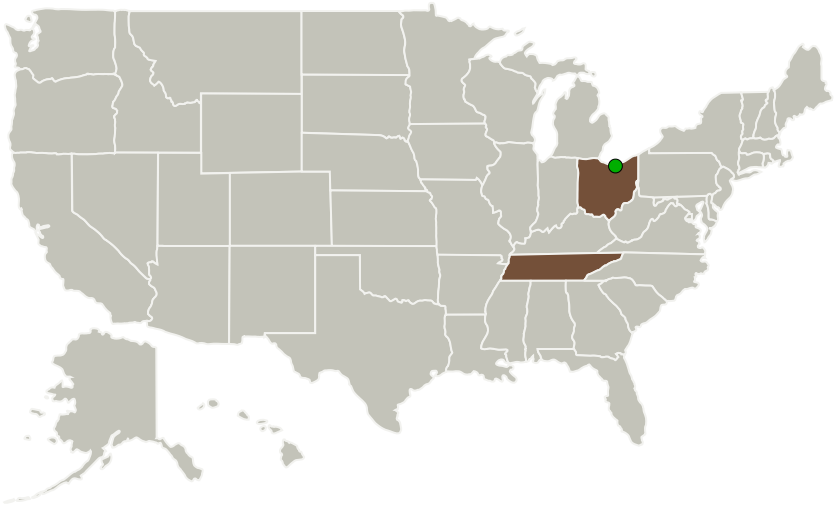
# Autonomus I&C Maintenance and Health Monitoring System for Fission Surface Power, Phase I

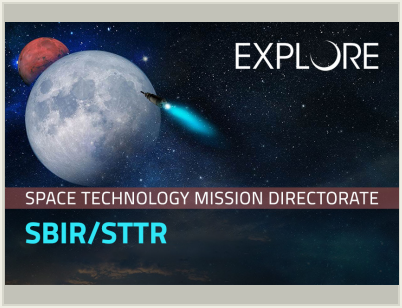
Completed Technology Project (2010 - 2010)

## Project Introduction

There currently exists no end-to-end reactor/power conversion monitoring system that can provide both autonomous health monitoring, but also in-situ sensor calibration and response time testing without human interface. One of the key challenges facing space nuclear power systems is their extremely remote location and requirement for multi-year missions. The current benchmark system has a mission life of at least 8 years during which time there is no opportunity for repair, sensor calibrations, or any maintenance of any kind. By contrast, terrestrial-based nuclear power plants undergo periodic outages during which time sensor calibrations can be performed. Current technology relies heavily on real-time human interaction, monitoring and control. Due to the long communication times between the Earth and Moon, or Mars, real-time human control is not possible. Therefore, these emerging programs have a critical need to develop autonomous health monitoring and control technology. Analysis and Measurement Services Corporation proposes to develop a modular signal processing platform that will enable robust system monitoring. The proposed system, once fully developed, will be able to detect system anomalies, based on advanced analytical and empirical analysis and will enable autonomous reactor operation and corrective action.

## Primary U.S. Work Locations and Key Partners



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| Organizations Performing Work | Role | Type | Location |
|---|---|---|---|
| Analysis and Measurement Services Corporation | Lead Organization | Industry | Knoxville, Tennessee |
| Glenn Research Center(GRC) | Supporting Organization | NASA Center | Cleveland, Ohio |

| Primary U.S. Work Locations | |
|---|---|
| Ohio | Tennessee |

## Project Transitions

**January 2010:** Project Start

**July 2010:** Closed out

**Closeout Documentation:**

- Final Summary Chart*(https://techport.nasa.gov/file/140112)*

## Organizational Responsibility

**Responsible Mission Directorate:**

Space Technology Mission Directorate (STMD)

**Lead Organization:**

Analysis and Measurement Services Corporation

**Responsible Program:**

Small Business Innovation Research/Small Business Tech Transfer

## Project Management

**Program Director:**

Jason L Kessler

**Program Manager:**

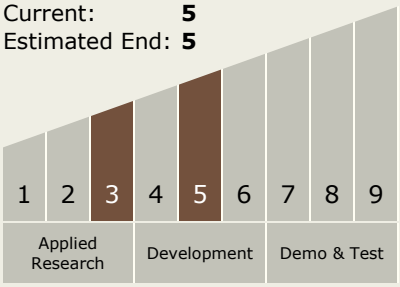
Carlos Torrez

**Principal Investigator:**

Brent Shumaker

## Technology Maturity (TRL)

Start: **3**
Current: **5**
Estimated End: **5**



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## Technology Areas

**Primary:**

- TX03 Aerospace Power and Energy Storage
  - TX03.3 Power Management and Distribution
    - TX03.3.1 Management and Control

## Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System